**Classwork 91H TEACHER NOTES**

**Restricting Domain on Rational Functions Using Interval & Set-Builder Notation**

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| **CRS** | Algebra 2 Content |
| **Objective** |  |

The **domain** of a function is the set of all possible input values (usually x), which allows the function to work.

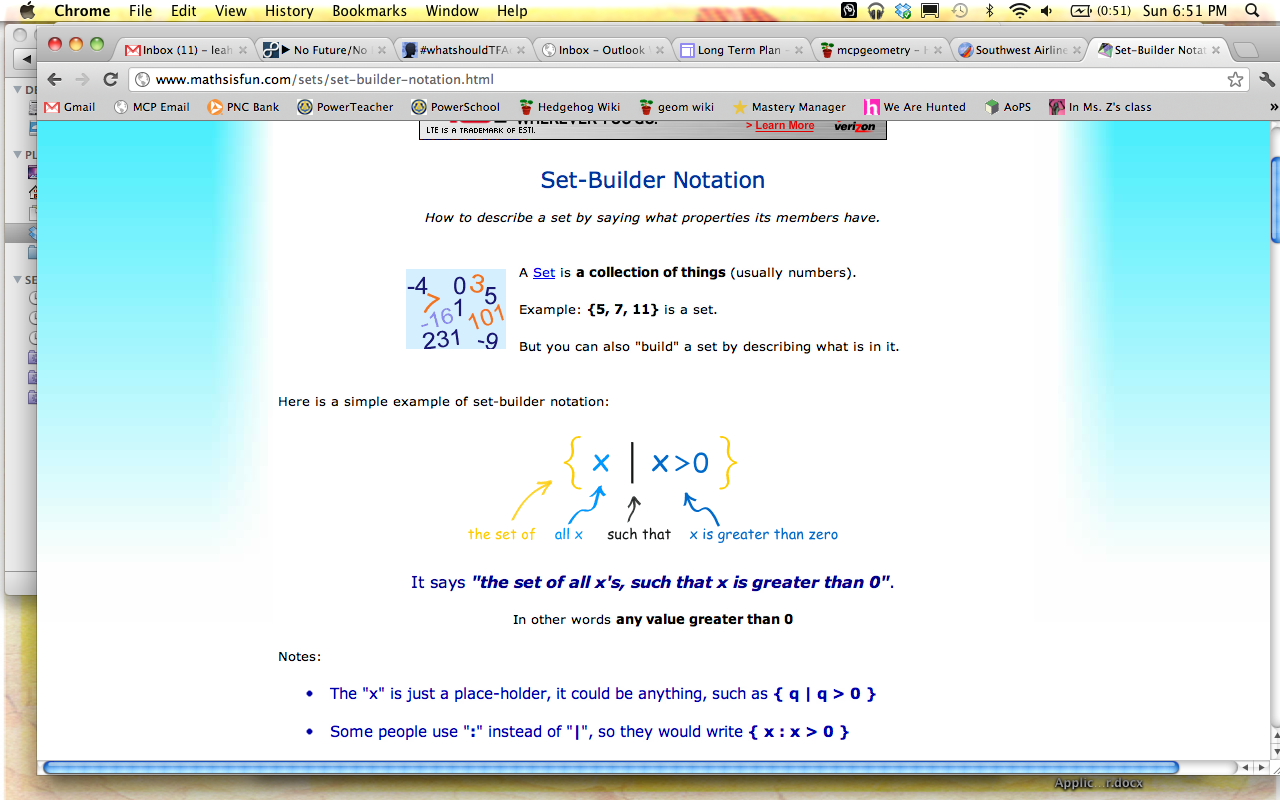
What values can be substituted into x to get a *valid* output? What values will make the expression undefined? We must exclude numbers from a rational expression’s domain that make the denominator zero.

**Example 1** – Simplify each rational expression. Find all the numbers that must be excluded from the domain of each rational expression.

|  |  |
| --- | --- |
| a. | b. |
| c. | d. |

From the previous examples, we know how to find restrictions on the domain of a rational function. Now we will learn how to use interval and set builder notation to represent the domain of a rational expression. A set is a collection of things, and in our case, it will represent the real numbers in the domain of a rational function that make it true.

Here is an example of how to use **set-builder notation** to represent the expression x > 0:



**Example 2:** Write the expression in set-builder notation.

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| --- | --- |
| a.  Read (write out): | b. w > 3  Read (write out): |
| c.  or m > 5  Read (write out): | d.  Read (write out): |

**Example 3:** Use set-builder notation to find the domain of each rational function.

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| --- | --- |
| a.  Set-builder notation:  Read (write out): | b.  Set-builder notation:  Read (write out): |
| c.  Set-builder notation:  Read (write out): | d.  Set-builder notation:  Read (write out): |

What does infinity mean?

**Interval Notation** – Sets of real numbers can be represented using interval notation.

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| --- | --- | --- | --- | --- |
| **Example:** | **Number Line** (how we learned in Algebra): | **Number Line Using Interval Notation:** | **Interval Notation with Symbols:** | **Meaning:** |
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|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| or |  |  |  |  |
| or |  |  |  |  |

**Example 4:** Express each interval in set-builder notation and graph the interval on a number line.

|  |  |  |
| --- | --- | --- |
| a. (-1, 4] | b. [2.5, 4] | c. |

**Directions:** Express each interval in set-builder notation and graph the interval on a number line.

|  |  |  |
| --- | --- | --- |
| 1) [-2, 5) | 2) [1, 3.5] | 3) |

**Example 5:** Simplify each rational expression. Use interval and set-builder notation to represent the domain of each rational function.

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| --- | --- | --- |
| a.  Set-builder notation:  Graph for Interval Notation:  Interval Notation: | b.  Set-builder notation:  Graph for Interval Notation:  Interval Notation: | c.  Set-builder notation:  Graph for Interval Notation:  Interval Notation: |

**Directions:** Simplify each rational expression. Use interval and set-builder notation to represent the domain of each rational function.

|  |  |  |  |
| --- | --- | --- | --- |
| 1)  Set-builder notation:  Graph for Interval Notation:  Interval Notation: | 2)  Set-builder notation:  Graph for Interval Notation:  Interval Notation: | | 3)  Set-builder notation:  Graph for Interval Notation:  Interval Notation: |
| 4)  Set-builder notation:  Interval Notation: | 5)  Set-builder notation:  Interval Notation: | | 6)  Set-builder notation:  Interval Notation: |
| 7)  Set-Builder: Interval: | | 8)  Set-Builder: Interval: | |

Extra Resources:

